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Maritimes Region

Canadian Science Advisory Secretariat
Science Response 2017/015

LOBSTER (*HOMARUS AMERICANUS*) IN LOBSTER FISHING AREA 41 (4X + 5Zc): 2016 STOCK STATUS UPDATE

Context

The status of the lobster resource in Lobster Fishing Area (LFA) 41 was last fully assessed in December 2013 (Pezzack et al. 2015). A Precautionary Approach proposed for lobster in LFA 41 uses multiple primary indicators with boundaries to guide in setting harvest control rules and secondary indicators to aid in interpreting changes in the primary indicators. There is no single reference point for this fishery. This Science Response updates primary indicators to 2016. During the 2015 update, concerns were raised on the applicability of indicators to providing advice on the total allowable catch (TAC), as well as the sensitivity of the fishery independent indicators to the strata chosen for their estimation. These issues will be addressed at a Stock Assessment Framework meeting scheduled for January 2017. Analyses used in this update were the same as those from previous updates (e.g. DFO 2016).

This Science Response Report results from the Science Response Process of November 16, 2016, on the 2016 Lobster Fishing Area (LFA) 41 Lobster Stock Status Update.

Background

Commercial lobster fishing in LFA 41 (Figure 1) occurs offshore, from the 50 nautical mile line (92 km) to the upper continental slope, within Northwest Atlantic Fisheries Organization (NAFO) Divisions 4X and the Canadian portion of 5Z (5Zc).

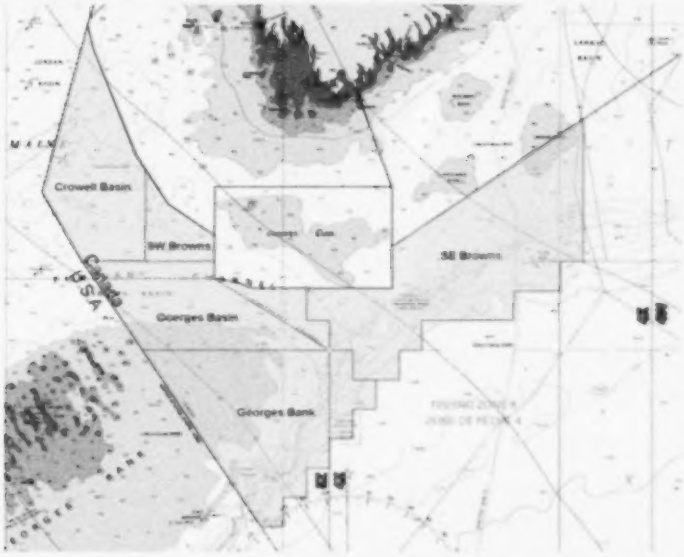

Figure 1. Map showing LFA 41 offshore subareas for primary indicators (4X - Crowell Basin, Southwest Browns, and Southeast Browns, and 5Z - Georges Basin and Georges Bank).

Canada

The LFA 41 fishery operates under the Integrated Fisheries Management Plan (IFMP) with 8 licenses and a TAC of 720 tonnes (t). The TAC was established in 1985 based on landings history and has remained unchanged since that time (Figure 2). It is the only lobster fishery in Canada that is managed with a TAC. This fishery has also maintained a Marine Stewardship Council (MSC) certification since 2010.

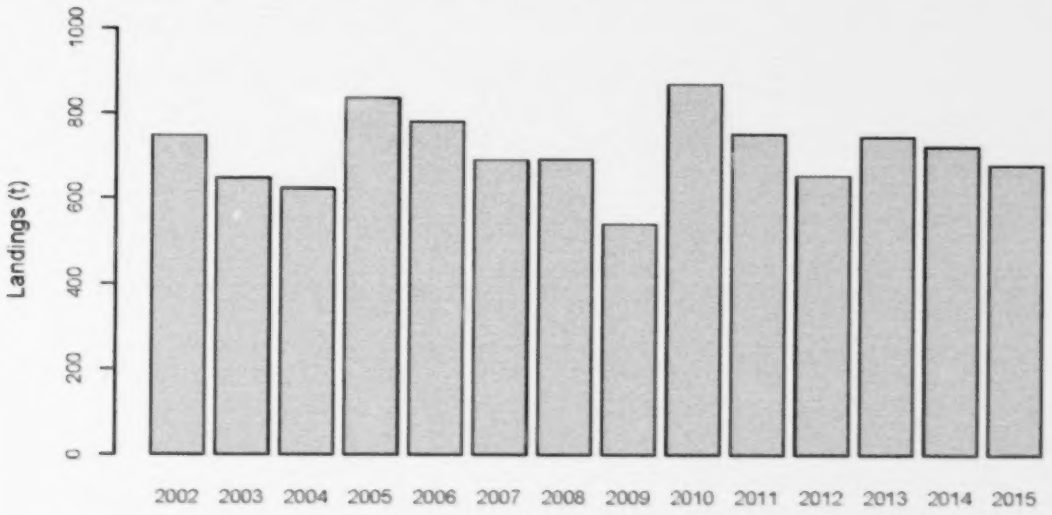

Figure 2. Landings (t) for Lobster Fishing Area 41 from 2002-2015 against Total Allowable Catch of 720 t.

Analysis and Response

Primary abundance indicators are based on the mean number of lobsters per tow in Research Vessel (RV) trawl surveys. Two indicators use the Department of Fisheries and Oceans (DFO) Maritimes Region RV surveys, while the other two indicators depend on data from United States (US) surveys. The US survey indicators have been developed but not updated in this report to maintain the consistency of use of data described in the last framework/assessment (Pezzack et al. 2015). These indicators will be reviewed in the framework and assessment processes scheduled in winter 2016 - 2017. Median size of females in trawl surveys and in at-sea samples of the commercial catch are the indicators linked to fishing pressure and reproduction.

Number Per Tow in Research Vessel Surveys

Stratified mean number of lobsters per tow from the DFO Maritimes Region Summer RV Survey (4X) for the last 36 years (1980 to 2016) show that recent catch rates are the highest on record (Figure 3). The upper boundary is based on 50% of the median of the annual mean survey catch rate for the 1995-2009 period (1.48) and the lower boundary is based on 40% of the median of the annual mean survey catch rate for the 1983-1994 period (0.16). The metric for assessing where the catch rate is relative to the upper boundary is the 3-year moving average of the mean survey catch. For 2016, this metric is 17.10 lobsters per tow, which is above the upper boundary.

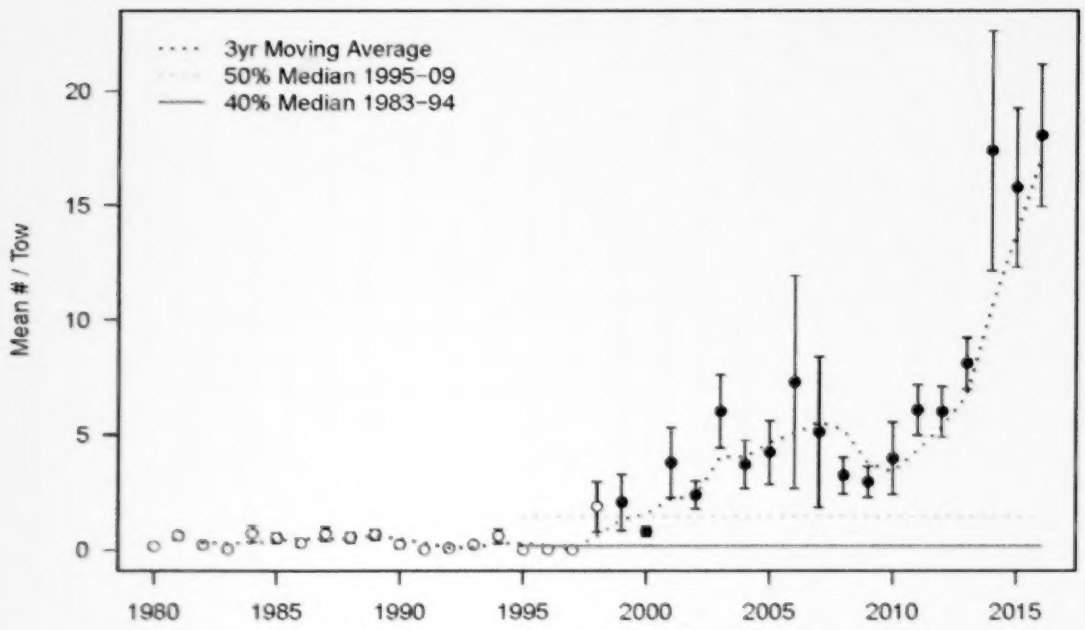

Figure 3. Stratified mean number of lobsters per tow with standard errors and a 3-year moving average from the DFO Maritimes Region Summer Research Vessel trawl survey in 4X (Strata 477-484). Open circles (1980-1998) represent the historical reported means and standard errors.

The stratified mean number of lobsters per tow from the DFO Maritimes Region Winter RV trawl survey (5Z) in recent years are among the highest on record. The upper boundary is based on 50% of the median of the annual mean survey catch rate for the 1995-2009 period (0.35), and the lower boundary is based on 40% of the median of the annual mean survey catch rate for the 1987-1994 period (0.07). For 2016, the 3-year moving average is 1.00 lobsters per tow, which is above the upper boundary but a decrease from the 2015 value of 2.67 (Figure 4).

Large Female Size

The mean number per tow of females greater than or equal to 140 mm carapace length (CL) in the DFO Maritimes Region Summer trawl survey (4X 1999-2016) is an abundance indicator but also a proxy for both exploitation rate and reproductive potential. Small sample sizes in the trawl surveys add caution to the interpretation of this indicator. The upper boundary is 80% of the minimum value of the time series (0.27). For 2016, the 3-year moving average is 1.32, which is above the upper boundary but a decrease from the 2015 value of 2.79 (Figure 4).

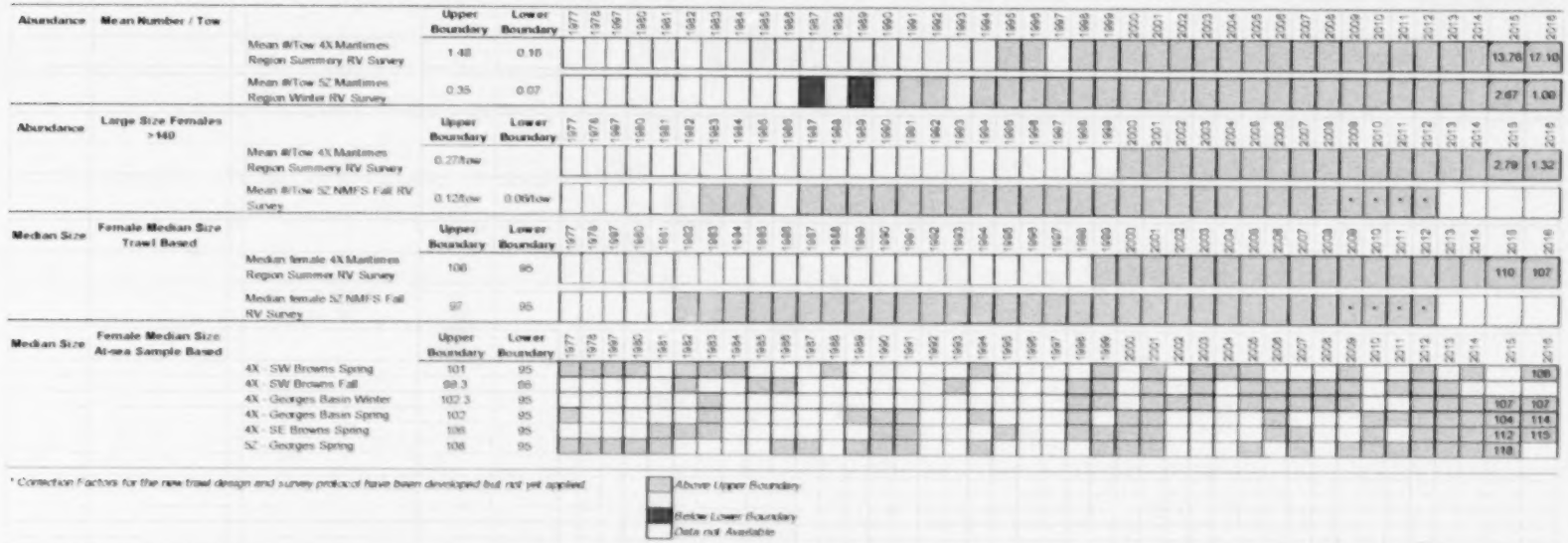

Figure 4. Primary indicators in the offshore lobster (Lobster Fishing Area 41) fishery.

Median Female Size

The median female size indicators in the last assessment (Pezzack et al. 2015), based on trawl surveys and at-sea samples, are proxies for exploitation rate and reproductive potential. As indicated above, indicators from the US RV trawl survey are not updated in this science response.

In 4X, the Upper Boundary for median female size based on the DFO Maritimes Region Summer RV survey is the midpoint between the median size for the reference period and the size at 50% maturity (1999-2012, 106 mm CL). The lower boundary is the size at 50% maturity, which was historically estimated as being 95 mm CL. As proposed for the previous indicator, the metric for assessing where the median female size is relative to the boundary is the 3-year moving average of the median female size. For the 2016 fishing year, this metric is 107 mm CL, which is only 1 mm CL above this indicator's Upper Boundary, and its decrease has been observed since 2014 (111 mm CL).

The upper boundary for median female size based on at-sea samples is also the midpoint between the median size for the reference period (1977–2012) and the lower boundary, which is the size at 50% maturity (95 mm CL). Unlike other indicators, the at-sea sample time series is interrupted by years with no available data; therefore, an updated 3-year moving average cannot be applied as the metric. Alternatively, the metric is the median female size specific to each time period and location selection (Figure 4). Median values for 4X show an increase in median size in 2016, except for 4X Georges Basin (Winter) which has remained the same. All of these median values are still above the upper boundary. The indicators for 4X-Southwest Browns (Fall) and 5Z Georges (Spring) are not updated as the data is not available.

Conclusions

Figure 4 uses a traffic light approach to display where the annual value falls relative to the upper and lower boundaries defined for each primary indicator used to assess stock status. The 2016 abundance indicators are above the upper boundary for the LFA 41 stock. The size indicators for the 2016 trawl-based 3-year mean and the at-sea sample medians for 4X are above the upper boundary. Following the 2013 framework (Pezzack et al. 2015), the LFA 41 lobster fishery is judged to be in the healthy zone.

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Sources of Information

DFO. 2016. Lobster (*Homarus americanus*) in Lobster Fishing Area 41 (4X + 5Zc): 2015 Stock Status Update. DFO Can. Sci. Advis. Sec. Sci. Resp. 2016/004.

Pezzack, D.S., C. Denton, M. Cassista-Da Ros, and M.J. Tremblay. 2015. Assessment of the Canadian LFA 41 Offshore Lobster (*Homarus americanus*) Fishery (NAFO Divisions 4X 5Zc). DFO Can. Sci. Advis. Sec. Res. Doc. 2015/066. v + 79 p.

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